VII-5. TERMINOLOGY USED IN THE REPORT

The aggregate employment impacts are referred to in this report in terms of person-years of employment. The term *person-years* of employment is typically used to describe employment impacts that are sustained over a period of time. For example, an investment program that supports 1,000 jobs per year over a 5-year period is said to support 5,000 person-years of employment. Describing employment impacts in terms of person-years also dispels some of the confusion over the "creation" of jobs. In the previous example, the 1,000 jobs supported in the last year of the investment program may technically have been created in the first year of the program and sustained for 4 additional years. While it is unclear whether the investment program "created" 1,000 jobs in the final year, it is clear the investment program created 5,000 person-years of employment over the 5-year period.

Demonstration of Competition in SWBT's Access Markets

This appendix describes the status of competition in access markets and demonstrates the lack of market power by SWBT in major segments. Given the geographic and customer concentrations in access markets and past regulatory policies, competition in access markets has proceeded, and will proceed, much differently than it did in the long distance markets. A fundamental difference is that IXCs are a primary source of competition for the LECs.[1]

This appendix will also show the concentration of demand in access markets and focuses primarily on the current presence of CAPs in SWBT's access markets. Competition from other sources is also demonstrated.

I. Changes in the Nature of Services Demanded/Offered are Important.

A. The Access Marketplace is Not Like the Long Distance Marketplace.

As the carrier access market becomes increasingly competitive, regulators might be inclined to draw upon the long distance regulatory experience to formulate policies intended to produce similar results for interstate access services. However, today's access marketplace is not like the long distance market of the mid-1980s, and policies deemed effective in establishing competition in the toll market will not necessarily produce similar results in the carrier access market.

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[1] "It should never be forgotten that the primary source of competition for the LECs is the interexchange carrier industry. IXCs are destined to be locked in competition with the LECs." Dr. Joseph S. Kraemer, "The Future of Local Competition: The War of All Against All," Deloitte Touche Tohmatsu International Telecommunications and Electronic Services Industry Program, 1993 Monograph Series, reprinted from Business Communications Review, March 1993 (Kraemer), p. 1.

1. The Demand Distribution In The Access Marketplace Is Not Like The Long Distance Marketplace.

a. Demand is Concentrated With Few Customers.

The demand characteristics of the long distance and access marketplaces are very different, so that one can expect significantly different customer reaction to increasing competition in the access marketplace versus what was observed in the MTS marketplace. First, demand in the access marketplace is much more highly concentrated. Taken together, SWBT's three largest access customers account for approximately 83 percent of SWBT's switched access business and 54 percent of special access revenues. As a result, SWBT could lose substantial revenue if just one of these customers would either switch to an alternate provider or self-supply their access requirements.[2] Thus, a single purchasing decision by just one customer could quickly and vastly alter the structure of the access market. In contrast, the long distance market consists of a very large number of comparatively smaller buyers, so that losing any one of these customers would not significantly affect the long distance company's financial results, nor the structure of the long distance market.

b. The Cost of Reversing Purchase Decisions Makes Proper Regulation Critical.

Switching back and forth between access carriers may involve greater investment commitments than switching between long distance providers. If long distance customers switch between long distance carriers, they can do so at any time virtually without penalty. In contrast, if a large access customer -- for example an IXC -- makes the decision to self-provision their access services, that decision will most likely be irreversible for a long time as the investment

[2] MCI, for example, has announced the formation of MCI Metro to provide access services for itself and other carriers.

required to self-provision may be, for the most part, sunk.[3] Thus, the cost to society in terms of inefficient use of resources caused by asymmetric regulation will be much greater in access markets than in long distance markets.

c. Demand Is Concentrated In Limited Geographic Areas.

Unlike the ubiquitous, nationwide long distance market, the access marketplace consists of many geographic sub-markets. Access demand is highly concentrated in limited geographic areas, primarily large urban business centers.

Table 1 below shows the approximate percentage of SWBT's access revenue concentrated in SWBT's top five market areas where competitive access providers have chosen to provide service:

Table 1
Concentration of SWBT Access Revenue in Five SWBT Markets

Market	Percent of Total SWBT Access Revenue
Dallas	10.9%
Houston	12.6%
Kansas City	5.8%
Tulsa	1.8%
San Antonio	5.4%
Total	36.5%

[3] By contrast, according to industry estimates many AT&T customers switched to another IXC and have subsequently switched back to AT&T for long distance service. Churn between IXCs is significant in that market.

As Table 1 indicates, over 36 percent of SWBT's total access revenue is generated in just the five markets where CAPs are relatively well established. Only 3.3 percent of SWBT's central offices account for 30 percent of SWBT's access revenues. Similarly, only 11.5 percent of SWBT's central offices account for 60 percent of SWBT's access revenues. In fact, SWBT estimates that CAPs have fiber optic cable in 211 buildings in three major cities (Dallas, Houston, and Kansas City) where SWBT terminates 23 percent of its DS3s and 20 percent of our DS1s. By placing only 600 miles of fiber optic cable along strategically planned routes, CAPs are now located within 3,000 feet of over 30 percent of DS3 and over 33 percent of DS1 terminations.

The geographic concentration of SWBT's access revenue is depicted visually by Maps 1 through 6, attached here. These maps demonstrate that the top 30 percent of SWBT's access revenues are concentrated geographically in just 43 of approximately 1,300 wire centers. Maps 2-6 are enlarged versions of the individual states shown together on Map 1.

B. Competitive Entry Into the Access Marketplace is Unlike the Experience of the Long Distance Marketplace.

1. Long Distance Competition was Ubiquitous.

Within a relatively short period of time after the onset of long distance competition, alternate supply was ubiquitously available. Even though competitors of AT&T did not possess networks capable of connecting most users, wholesale supply of network capacity could be used on a resale basis to provide uniform market coverage to retail customers. Networks not having "equal access" gained economically preferential connection with AT&T's networks. Thus, competitors of AT&T had a market-wide presence and were able to compete for all segments of the marketplace.

2. Access Competitors Utilize Highly Focused Entry Coincident With LEC Demand Distribution.

In contrast, due to the heavy concentration of access demand in limited areas, coupled with the fact that alternate providers have not been required to serve all customers ubiquitously, urban centers are especially attractive to competitive entry. Alternate providers can reach a large number of potential customers with relatively small and inexpensive networks that are strategically located in the most densely populated sections of large business centers. CAPs have chosen not to serve high-cost suburban and rural markets. The regulatory requirement that the LECs charge geographically averaged rates that include high-cost areas, while alternate providers have no pricing restrictions, further increases the attractiveness of large urban centers to competitive entry. To the extent economics of density exist (i.e., it is cheaper to provide service in more densely populated areas), geographically averaged rates preclude the LECs from passing these economies on to urban customers in the form of lower rates, whereas alternate providers are not so constrained.[4] Unlike the manner in which the Commission regulates SWBT, the Commission has not required CAPs to enter all markets, nor to serve all customers in the markets they do enter. As a result, equally efficient alternate providers have a competitive advantage in the high-density, high-margin areas because they can offer their services at prices that can be considerably lower than SWBT's geographically-averaged tariffed rates. More importantly, SWBT's averaged rates may induce less efficient providers to enter the market resulting in loss of economic efficiency.

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[4] According to Dr. Joseph S. Kraemer, "CAPs exist and will continue to exist because they are a tactical necessity for IXCs due to the naturally competitive business relationships existing between LECs and IXCs. . . In general, CAPs tend to be less expensive than LECs. That price advantage tends to be in the ten percent-twenty percent range for recurring services." Kraemer, p. 4.

C. The Regulatory Transition to Access Competition Cannot Be Handled Like The Long Distance Marketplace.

1. Relevant Markets Must be Determined.

Obviously, as the characteristics of the access marketplace are very different from the long distance marketplace (geographic and customer demand distribution and behavior of market participants), equivalent regulatory paradigms cannot be used. Defining the market as a service provided over a LEC's entire service area would lead to disastrous consequences in terms of both the LEC's ability to compete and protection of consumers not having a source of alternate supply. The proper definition of an access market should be based on two aspects: product dimension and geography. First, with regard to the product dimension, the "market" includes all substitutable products and services. Because many access services are substitutable and cross-elastic (e.g., DS3s can be substituted for DS1 services), all substitutable services must be considered in the formulation of the relevant market.

Second, the definition of a market also has a geographic dimension. As Table 1 and Maps 1 through 6 demonstrate, a very limited geographic area within SWBT's total service area contains a high percentage of the demand it serves. The appropriate geographic size of the market should be defined as that area within which customers have sufficient alternate service choices so that they can substitute away from the LEC's service in the event the LEC raises its price. As Schmalensee and Taylor explain:

> In effect, the analysis begins with a map of the networks of alternative service providers and interexchange carriers and identifies customers (and their associated volumes of demand) that are sufficiently close (given their size) that an economic alternative to LEC carrier access service exists.[5]

[5] Schmalensee and Taylor, p. 22.

Thus, proper identification of the geographic dimension of the market is critical to any evaluation of market power. To foster competition, access markets must reflect economic markets so that proper regulation can be applied to markets with different degrees of competition, i.e., streamlined regulation in competitive markets and price cap regulation in economic markets exhibiting less competition.

2. Regulation Must be Tailored to the Degree of Relevant Market Competition.

SWBT's data clearly shows that access markets vary tremendously. Levels of competition in these markets vary from little or no competition to intense competition in markets where one or more alternate providers operate. SWBT's analysis here plainly reveals, at a minimum, that SWBT (and most assuredly the other LECs) cannot be classified as entirely "dominant" or "nondominant." Unfortunately, the Commission has chosen to use just such classifications over the last decade. This must change.

Relevant markets must be utilized as the basis for determining regulatory oversight on a market area basis. Once these markets have been determined, regulation can be appropriately tailored to meet market needs. Markets in which little or no competition is present would retain the most oversight. Markets where competition exists would require (and should receive) little regulatory oversight. In this manner, consumers receive all the benefits of "true competition" while at the same time they are protected from the exercise of market power in less competitive markets. This also ensures equitable treatment for all providers since no provider is unnecessarily handicapped in the marketplace by "one size fits all" regulatory policies as the

LECs are today. Fortunately, USTA has provided a workable framework for market-area-based regulation.[6]

3. Extensive Rate Deaveraging has Taken Place and Will Continue.

The inevitable outcome in access markets is rate deaveraging. Access markets consist of many geographic submarkets with unique demand and supply characteristics and different underlying costs of provisioning the services. In a competitive environment, such differences lead to different product packages with different pricing structures and price levels. In fact, significant rate deaveraging has already occurred in the access marketplace, even though the LEC access rates are still, for the most part, geographically averaged. Competitive access providers, as well as the IXCs when they self-provision, experience differing costs and demand in each of the market areas where they build facilities. In addition, the significant number of optional calling plans and volume discounts options offered by IXCs means that long-distance prices have been significantly deaveraged. Since competitive providers face no regulatory pricing restraints and are allowed to individually price as desired, they already offer their services at different prices in different markets and to different customers within a market. As a result, access prices today are effectively geographically deaveraged. Further deaveraging is inevitable. This result is neither shocking nor undesirable.

Geographical deaveraging of access prices is taking place as an integral part of access competition. Precluding the LECs from competitive pricing responses by prohibiting the LECs from the same pricing flexibility utilized by the LECs' competitors cannot stop this

[6] USTA Comments, CC Docket No. 94-1, filed May 9, 1994 (USTA proposal).

competitive outcome. These prohibitions merely relegate the LECs to the sidelines in competitive markets as they watch demand for their services erode.

4. Addressability is the Proper Measure of Market Power.

Addressability (i.e., alternate supply availability) is the proper way to measure market power. Unlike market share, which is not a reliable indicator of market power, addressability is a forward-looking indicator relevant to the assessment of market power. Rather than basing regulatory policy on decisions that have been made in the past, addressability provides information relevant for today and in the future. The use of addressability will allow the Commission to tailor regulation to market conditions that exist today, instead of evaluating market changes and demand shifts that have already occurred. This process will result in equitable regulation for all providers and will maximize consumer benefits.

For a customer's demand to be addressable, an alternative provider must have facilities that can be readily extended to serve a customer upon request. Addressability is based on observable fact -- the physical presence of alternate providers with the capacity and geographic coverage to serve customers in a market area.[7] In order to obtain these facts, all interstate access providers must report to the Commission the information required to make a determination as to whether customers in a particular market area (one or more wire centers) have real alternatives to using the LEC's network. Specifically, the Commission should require all providers to file with the Commission a description of the area in which they make their

[7] Addressability incorporates a measure of capacity, but more importantly it considers the alternate providers' ability to deliver services to customers' locations. Since the majority of providers utilize fiber optic facilities, capacity has become much less important as capacity increases can be accomplished merely by replacing the electronics utilized. "Reach" is the primary factor that determines addressability.

service available to customers. This requirement can be satisfied by a general description of the service area (e.g., a listing of zip codes, city or county boundaries, LEC wire center, etc.), or by the filing of a service area map. To the extent that the Commission does not require common carriers to file service area descriptions, the carriers should file, on an annual basis, detailed maps depicting their network facilities within each area they serve, including planned additions scheduled in the next annual period. Attached as Maps 7 through 12 are facility maps of major access competitors in selected SWBT markets, as currently known by SWBT.[8] SWBT does not have the ability to determine this information with accuracy because alternative suppliers do not voluntarily make this information available to SWBT or their other competitors.

D. Markets are Becoming Highly Competitive.

1. Many Customers Have Alternate Supply.

For some time now, SWBT, the other LECs and numerous industry participants have been putting information on the record that indicates the highly competitive nature of the access marketplace. At the same time, LEC competitors characterize the LECs as monopoly providers even though the mere existence of their filings as competitive tools demonstrates that their positions are disingenuous. SWBT estimates that over 27 percent of its DS3 demand and over 24 percent of its DS1 demand originates in buildings in which CAP services have been verified by SWBT to be currently connected.[9] In addition, these figures are based on SWBT's current demand and do not include demand that has already shifted to alternate providers.

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[8] Competitive access providers do not make this information readily available, if at all. As a result, the areas actually covered by competitive providers may be considerably greater than depicted on these maps.

[9] Given the lack of publicly available information on CAP presences, these estimates are assuredly understated.

However, even more dramatic results are obtained when demand is analyzed on the more geographically limited market area basis, as it properly should be.

2. Competition Varies Greatly Between Market Areas.

As SWBT has indicated, regulation must be applied on a market area basis. Table 2 shows an analysis of the approximate percent of SWBT's DS1 and DS3 services originating in buildings connected to CAP networks in areas where CAPs are well established.

Table 2
SWBT Demand Immediately Addressable By CAPs[10]

Market	Percent of SWBT's DS3 Demand Originating In CAP Buildings	Percent of SWBT's DS1 Demand Originating In CAP Buildings
Dallas	**74%**	**47%**
Houston	**88%**	**59%**
Kansas City	**68%**	**58%**
San Antonio	**36%**	**41%**
Tulsa	**40%**	**32%**

As the data above clearly demonstrate, a significant portion of SWBT's existing customers in major markets have access to alternate supply. While SWBT's competitors would have customers believe they are high quality, capable providers, they would have regulators believe they are immaterial, weak, and do not now and will not for some time pose a significant competitive threat to the LECs. These competitors argue that they therefore require protection by regulation. The actual data tell the true story. LECs face formidable competition in many pluralistic markets and deserve immediate regulatory relief.

[10] As CAP facilities are currently known to SWBT.

Also revealing are data demonstrating how markets can vary even between wire center serving areas in individual cities. Table 3 below shows approximate alternate supply availability for selected wire centers in the Houston area.

Table 3
Differences in Addressability in Houston

Houston Wire Centers	Percent of DS3 Demand Originating In CAP Buildings	Percent of DS1 Demand Originating In CAP Buildings
Clay	95%	93%
Capitol	96%	97%
East Houston	0%	0%

Virtually every SWBT DS1 and DS3 service provided by SWBT in the Houston-Clay and Houston-Capitol wire centers originates in a building already connected to an alternate provider's network. At the same time, none of the SWBT demand in the wire center named East Houston originates in a building connected to a CAP network. These results confirm what SWBT has been saying for some time: competition for access services is not uniform or ubiquitous and effective competition exists today in certain predictable markets. Competition exists today in those geographic areas where access demand is most heavily concentrated, i.e., in wire centers like Houston-Clay and Houston-Capitol. It comes as no surprise to find that only these two wire centers represent over 78 percent of the DS3 demand and 51 percent of the DS1 demand in the Houston area. Clay and Capitol are the most densely populated business wire centers forming the "downtown" Houston business core. It is the heavy concentration of demand and the specific and present targeting of these dense areas by LEC competitors that make the need for market-area-based regulation so apparent and immediate.

E. Certain Market Areas Require Immediate Regulatory Relief.

Simple truths are clear from the data SWBT has provided in this pleading. Demand in the access marketplace is concentrated both in customers and in geography. Competition is intense in densely populated business areas, while in other less dense areas competition has yet to emerge. This variance in competitiveness between market areas requires focused regulation. Competitive wire centers should be removed from price cap regulation. The Commission should not delay relief to the LECs until competition is ubiquitous. Based on past regulatory decisions, it is not reasonable to expect that competition will develop in the same manner or at the same pace in all access markets. A primary reason for this is the average ratemaking policies utilized by the Commission over the past decades. These policies have led to significant distortions of rates between some high cost and low cost areas. Until these distortions are corrected, competitors likely will not enter high cost areas where LEC prices are low by comparison. At the same time, SWBT is facing significant competitive losses in the low cost areas, where pricing distortions have attracted substantial competitive entry. Not granting the LECs pricing flexibility in the competitive markets would place undue financial burdens on SWBT and other LECs, and would go against sound economic principles and equitable treatment of all providers.

Any delay will make LEC access demand "easy prey" for competitors who are reaping unearned benefits through existing regulatory policies. USTA's proposal will correct these regulatory imbalances and make it possible for SWBT and the other LECs to compete fairly with other providers in competitive markets while at the same time protecting consumers in less competitive markets. USTA's proposal provides a workable framework for regulatory

reform. SWBT urges the Commission to implement the USTA proposal as a part of price cap review.

II. EXPLOSIVE GROWTH IN COMPETITIVE ALTERNATIVES (TI 1A, TI 1D)

The industry has undergone rapid and significant changes in technology and regulation during recent years which have rendered obsolete the fundamental basis for many of the access charge rules and which have led to increased competition in the interstate access services market.[11]

A. Competitive Access Providers

SWBT faces strong competition from CAPs. These CAPs provide special access service via fiber networks in at least seven metropolitan areas in SWBT's service territory (Dallas/Ft. Worth, Houston, Kansas City, St. Louis, San Antonio, Tulsa and Wichita).[12] CAPs typically supply a dedicated connection between interexchange carriers and large end users, bypassing SWBT entirely.

Because access charges paid to LECs make up a relatively large share of the IXCs' operating costs, IXCs have strong financial incentives to use lower-priced CAPs to reduce

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[11] "Federal Perspectives on Access Charge Reform: A Staff Analysis," Common Carrier Bureau, released April 30, 1993, pp. 16-17 (Staff Analysis). These changed circumstances are discussed in detail in the Staff Analysis and numerous other industry papers and filings, and SWBT will not repeat them here.

[12] In addition, CAPs are also constructing facilities in other areas within SWBT's service territory -- for example: Austin, Texas; Springfield, Missouri; and Little Rock, Arkansas.

their access charge expenses. For example, Dr. Kraemer estimates that each one percentage point reduction in LEC access charges increases AT&T's stock price by $1.20 per share.[13]

In the few years since Divestiture, the industry has experienced a proliferation of CAP-provided networks. As of two years ago,[14] the CAP industry had evolved to at least 32 different CAPs operating in a total of 32 cities; 50 percent of CAP cities were served by more than one CAP; Metropolitan Fiber Services (MFS) and Teleport accounted for over 50 percent of CAP revenues with 18 networks; and Cable TV companies (which own many of the CAPs including Teleport) were involved in 50 percent of CAP revenues. According to Connecticut Research, CAP revenues grew by 43 percent overall in 1993.[15] Dr. Harris presents an analysis that demonstrates that CAP presence has exploded to the point where CAPs are now present in 125 cities.[16] Based on a review of gross receipts taxes paid by CAPs in Dallas since the second quarter of 1991, Texas CAP revenue has grown at an average annual rate of over 150 percent in that market (2nd quarter 1991 through 4th quarter 1993).

Many CAPs are not inexperienced, fledgling, start-up companies. Often, they are subsidiaries of larger corporate entities having considerable financial resources. As the Commission staff pointed out in its recent staff working paper on Access Charge Reform, "CAPs have also formed strategic partnerships with, and attracted major investments from, cable

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[13] Kraemer, p. 1. Kraemer concludes that the effect on MCI is comparable.

[14] Given the pace at which CAP networks are expanding, a March 1992 survey of CAP deployment is now likely outdated.

[15] Connecticut Research Report On: Competitive Telecommunications, Vol. 1, No. 1, November 1, 1993, p. I-2.

[16] Professor Robert G. Harris, "Economic Benefits of LEC Price Cap Reforms," USTA Comments, CC Docket No. 94-1, filed May 9, 1994, Table B-4.

television companies, electric utilities, large construction firms, and other entities with extensive financial resources."[17] As illustrated in Table 5, there are at least eleven operating CAPs owned by nine cable TV companies.

Table 5
CAP Ownership: The Relationship With Cable TV

CAP (partial list of cities served)	CAP Ownership
AxS (Charlotte, North Carolina)	Time Warner and Vision Cable
Digital Direct (Chicago, Seattle)	TCI
Eastern TeleLogic (Philadelphia)	Comcast
Hyperion Telecommunications (Jacksonville, Wichita)	Adelphia and Continental
Hyperion (Syracuse, New York)	Adelphia and News Channel
Hyperion (Pittsburgh)	Adelphia
Indiana Digital Access (Indianapolis)	Time Warner (ATC)
Jones Lightwave (Englewood, Colorado; Chicago; Atlanta; Miami)	Jones Intercable
Kansas City Fibernet (Kansas City)	TCI and Time Warner
Phonoscope (Houston)	Phonoscope (leasing fiber to Teleport)
Teleport (Boston, Chicago, Dallas, Houston, Los Angeles, New York, San Francisco, St. Louis)	TCI, Cox, Continental, Comcast, Time Warner

Many industry analysts have concluded that there is a natural synergy between cable TV and the CAPs. Cable networks serve residential areas and CAPs serve the business areas. CAPs are expanding their markets by using cable TV fiber and right-of-way to reach the suburbs, thus reaching out to medium-sized customers. As cable TV revenue growth has been

[17] Staff Analysis, p. 18.

sluggish, cable companies are looking to expand revenues through enhanced video services and telecommunication services. John Malone, Chief Executive Officer of TeleCommunications, Inc. (TCI), the largest cable TV multiple system operator (MSO), and 24.95 percent owner of Teleport, said in 1992, "I would guess if the access market [for cable] is not a $1 billion business three years out, we're all wasting a lot of time and capital."[18]

CAPs have already made significant inroads into the revenue streams of the LECs.

- In New York City, where numerous CAPs are competing with NYNEX, CAPs have captured nearly 50 percent of the DS1/DS3 market and in Houston and Dallas, they have over 20 percent of the market.

- The Miami Herald reported on 12/27/92 that, "In Miami, Intermedia (a CAP) has cut into Southern Bell's phone share to the tune of thousands of dollars a year, draining big-business dollars from major Southern Bell customers, like SunBank/South Florida, Electronic Data Systems, and MCI Communications Corp."

- A July 30, 1992 Business Research Group (BRG) report states that "Corporate use of CAPs is increasing steadily" based on a BRG study of 100 companies with large data networking needs. The report stated that about 20 percent of the respondents use CAPs and that "on average, CAPs handle one-quarter of those users' traffic."

As research indicates, SWBT faces intense competition in many markets from formidable competitors that are expanding rapidly. SWBT must have immediate regulatory relief if it is to compete with these firms.

B. Cable TV Providers

LECs face competitive challenges from a number of other fronts, made possible by the convergence of telephony and computer technologies. The cable TV industry seems to be uniquely placed to offer extremely strong competition to LECs. The cable TV industry has

[18] Kraemer, p. 6.

grown and consolidated to the point where the top ten cable TV MSOs control about 55 percent of the over 60 million cable TV subscribers.[19] This consolidation, coupled with cable TV ownership of CAPs, has resulted in financially strong and experienced cable TV companies that are already present in the LECs' territories. These companies are extremely well situated to quickly become formidable competitors of the LECs for local exchange service. For example, two major cable TV providers (TCI and Time Warner) are already located in SWBT's territory.[20]

Cable TV companies are aggressively rebuilding their coaxial networks into hybrid fiber/coaxial networks. Typically, cable companies are placing fiber to nodes serving 400 to 2,000 homes and are using coaxial cable to carry the signals the "last mile." This rebuilding has already started and is expected to be completed for many of the major MSOs such as TCI and Time Warner, by 1998. Some recent announcements include:

- Time Warner announced in January 1993 the creation of the "Full Service Network" which will provide a wide range of interactive information, entertainment and communications services including video-on-demand, interactive video games, home shopping and banking, distance learning and personal communications service. Time Warner expects to have four residential Orlando neighborhoods (4,000 homes) working in early 1994.[21] Time Warner substantiated this announcement in its Tenth Quarterly Report of PCS Experimental Work, when it reported that it is "upgrading its Orlando, Florida cable system to create the world's first [emphasis in original] FSN, a fiber rich,

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[19] Kraemer, p. 5. Kraemer's quoted estimate of 60 million cable subscribers was as of the end of 1991.

[20] On April 1, 1994, Time Warner Communications of Austin, L.P., and Time Warner Communications of Houston, L.P., filed tariffs at the Commission for interstate communications services.

[21] "Time Warner Cable Selects First Orlando Areas For Full Service Network," Time Warner News Release, Business Wire, May 27, 1993.

digital system offering consumers and businesses a vast array of interactive entertainment and telecommunications [emphasis added] services."[22]

- TCI announced in April 1993 that it will invest $2B to upgrade its national cable plant with fiber optic cable within the next four years. Specifically, TCI plans to change its system into a "superhighway that can transmit unprecedented amounts of video, voices and data. It has begun a "total system rebuild" with fiber optics and electric in North Texas and other areas throughout its network.[23] TCI expects that 90 percent of its 10 million subscribers will be served by fiber before 1998.

The cable operators are rebuilding their systems with the most recent technology in response to several factors:

- The coaxial trunk lines installed years ago are wearing out and are costly to maintain. Also, the transmission quality at the end of long cascades of amplifiers is unreliable.

- Cable TV revenues have flattened out, creating a need for cable operators to develop new revenues sources (such as pay-per-view, near video-on-demand or video-on-demand, interactive video) -- not easily supported by the current coaxial based network.

- Refranchising agreements are being struck with the franchising authorities which are asking for -- and receiving -- commitments for state-of-the-art cable system technology (e.g., fiber-to-the-node architecture).

- Direct Broadcast Satellites (DBS), has recently obtained the ability to send hundreds of programming channels to a customer's $700 satellite dish. This has created a need for cable operators to increase channel capacity on their existing 36 - 70 channel systems.

Because of the tremendous bandwidth that these fiber upgrades offer, cable operators are not only looking to expand services and channels, but are also looking to the next step -- offering telephone-type services. As John Malone, CEO of TCI, stated in Newsweek,

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[22] Time Warner, Tenth Quarterly Report of PCS Experimental Work, transmitted to FCC, Office of Engineering & Technology on September 14, 1993, p. 5.

[23] See, for example, "TCI Starts Fiber-Optic Changeover in D-FW," by Tom Steinert/Threlkeld, The Dallas Morning News, December 10, 1993, p. 3D.

"I believe I can be the low-cost provider and the earliest implementer of two-way, broadband communications. I believe I can win that race."[24]

Already many of the cable systems in the United Kingdom (U.K.) are offering telephone service in competition with the incumbent telephone company, British Telecom. While penetration of cable TV service in the U.K.[25] is significantly below that in the U.S., in those areas in the U.K. where telephone service is offered by cable TV companies, these cable TV companies are reporting telephone penetrations of approximately 22 percent. TeleWest (owned by U S WEST and TCI) supplies 101,000 (over 60 percent) of its 160,000 U.K. cable TV subscribers with telephone service.[26] In 1993, Comcast Corp. had signed up more than 20 percent of its 60,000 cable TV subscribers to phone service in the U.K.[27] Southwestern Bell Corporation has an ownership interest in cable TV franchises in the U.K. where phone service penetration has averaged approximately 23 percent of homes passed. Although the U.K. situation may not be directly comparable to the United States, it clearly shows the vulnerability of incumbent telephone companies to competition from cable TV operators. A similar experience in the U.S. would dramatically affect LEC revenues and LEC ability to provide universal telephone service. Further, cable TV companies can be expected to offer telephone service to densely populated, lower-cost areas first.

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[24] Newsweek, May 31, 1993.

[25] "Phone, Cable Deals Let U.S. Test Future," USA Today, June 28, 1993.

[26] "U.K. Company News/Telewest Raises Pounds 190M To Expand Its Networks," The Financial Times via First by Individual, Inc., July 23, 1993.

[27] Mark Robichaux, "Cable-Ready - With America Pretty Much Wired, U.S. Companies Begin a Cable Land Rush Overseas," Wall Street Journal, March 26, 1993.

In addition to upgrading its systems, the cable TV industry is also positioning itself for entry into the telecommunications business by forming alliances with telecommunications companies. Earlier this year, Time Warner agreed to a U S WEST purchase of 25 percent of Time Warner Entertainment, which owns cable franchises in 36 states, for $2.5B. U S WEST will manage the telephone service operations over Time Warner's cable systems. Richard McCormick, U S WEST Chairman, then stated that they intend to offer customers a "one-stop shopping source for local cable and telephone service."[28] In U S WEST's second quarter report, Richard McCormick, stated: "the Full Service Networks also will provide local wireline telephone service in the U.S. -- a first for a regional Bell company outside its home territory." As noted previously, Time Warner has filed tariffs with the Commission for the provision of interstate communications services. Bell Atlantic and TCI announced on October 12, 1993, that they had signed a letter of intent to merge Bell Atlantic (13 million cellular, consumer, business and government customers), TCI (10 million cable subscribers in 49 states plus international interests in cable operations in the U.K. and Europe), and Liberty Media (interest in 17 cable companies serving about 3 million customers plus extensive programming holdings). While the Bell Atlantic/TCI deal subsequently was canceled, the reason cited for the cancellation of the proposed merger was the significantly reduced attractiveness of investment in the cable business as a result of the FCC's cable regulation.[29] While recent cable TV/telephone alliances have slowed, it is likely that the pace of these alliances will soon pick up again. Other cable TV/telecommunications alliances include:

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[28] "Furtherdown the Cable: This Month's News Roundup," Telecommunications Review: The Gordon Report, Vol. 10, No. 6, June 1993, p. 4.

[29] The proposed SBC-Cox Cable alliance was abandoned for similar reasons.

- BellSouth is expected to acquire 22.5 percent of Prime Cable (an Austin, Texas-based cable operator with over 500,000 subscribers).

- TCI, AT&T and U S West are conducting a pay-per-view trial in Littleton, Colorado with 400 customers.

- Teleport has formed joint ventures with eleven cable TV companies (four of the eleven own Teleport) to build new competitive access services in several cities and to expand existing Teleport networks in others.

- AT&T is participating in Viacom's trial of interactive video services with 1,000 Viacom customers in Castro Valley, California.

- AT&T is providing the broadband switch for the Time Warner/US WEST "Full Service Network" in Orlando, Florida.

- Time Warner and MCI teamed with First Pacific Networks to test deployment of voice over cable in Time Warner's Queens, New York cable system.

- TCI and U S West as partners are providing cable TV and telephone service in the United Kingdom and parts of Europe.

- Bell Atlantic has entered into an agreement with Sammons, an incumbent cable provider, to provide transport of its cable service over a planned fiber network in Morris County, New Jersey.

- Future Vision, a video provider who will compete with Adelphia, the incumbent cable operator, has agreed to subscribe to Bell Atlantic's planned video platform in Dover, New Jersey.

- NYNEX plans to offer "video dialtone" to Liberty Cable. NYNEX will provide fiber optic cable to carry video signals for 2,000 Liberty Cable Television customers in Manhattan. Time Warner has also agreed to join the venture.

Major industry participants are scrambling for position. Thus, cable TV providers will be major players in the race to provide competitive telecommunications services.

C. Wireless Providers

Another major force will be the fast-growing wireless industry. The cellular wireless industry is experiencing a phenomenal expansion -- it now has about 12 million

subscribers and is growing at a 30 percent annual rate of growth.[30] Although most of this growth has resulted from the stimulation of a new mobility market, it would be naive to think that this growth did not have some affect on wireline telephone line growth -- whether it is the additional line market or the replacement of landlines owned by customers who prefer the mobility of wireless telephone service. As cellular rates fall, more wireline customers will migrate toward wireless telephone service.

Currently, there are two cellular operations authorized in each metropolitan area in the nation. As the wireless spectrum is opened for up to seven additional operators, wireless telecommunications rates will fall, putting additional competitive pressures on the LECs. As with cable TV, other parties are involved in the wireless arena:

- MCI formed a consortium of 150 companies to attempt to get a national (Personal Communications Service (PCS) license.
- Sprint joined a consortium of international communications and industrial companies as an investor in Motorola's Iridium project.
- AT&T has announced plans to purchase McCaw Cellular for $12.6B.
- Cox Cable received a Pioneer's Preference license for its work in using existing coaxial and fiber cables to reduce the cost of deploying PCS.

D. Electric Utilities

Electric utilities are relative newcomers as telecommunications competitors. However, the power industry, along with a number of individual electric utilities, are rapidly gaining prominence as a telecommunications provider. Electric utilities are aggressively expanding into telecommunications.

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[30] "AT&T's Deal: A Giant Steps Into New Arena," Washington Post, August 23, 1993.

Power companies are keenly interested and rapidly investing in telecommunications because of cost and environmental concerns regarding new generating plants. Both reasons make it increasingly hard for regulatory commissions to approve their construction and pass costs through to ratepayers. Federal laws and state regulatory policies now emphasize that power companies must not only generate power more efficiently, but also control usage by changing customer demand. This is called "demand-side management," or DSM. DSM is used to forego expensive increases in power generating capacity.

To implement DSM, electric utilities need high technology, real-time ways to measure power use and to track customer response to pricing incentives (like lower prices for using big appliances at off-peak times) offered to alter peak-load usage. A key way to measure usage to evaluate DSM pricing incentives is to deploy fiber optic[31] systems that provide measurement capabilities. If DSM efforts enable power companies to affect usage enough to postpone building generating capacity for a number of years, DSM can be cost-justified.

Of course, because energy usage management takes up only a tiny fraction of the fiber network's capacity (some estimate only five percent), electric utilities are leasing the excess capacity to other companies, including CAPs, or are offering other services themselves (e.g., local area networks, cable TV, access services for IXCs). Most of these service offerings compete directly with similar telco services.

One of the best-publicized trials of such services is located in SWBT's service area. Entergy, a holding company providing power to customers in Arkansas, Texas, Louisiana and Mississippi, is placing fiber to 50 homes in Chenal Valley, an upscale Little Rock, Arkansas

[31] Fiber optic technology is attractive to electric utilities since it is relatively unaffected by electromagnetic disturbances, unlike copper-based forms of transmission.